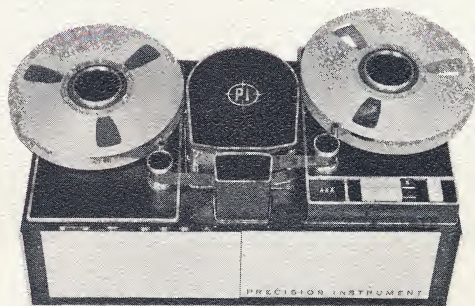


MODEL PI-3V PORTABLE TELEVISION RECORDER

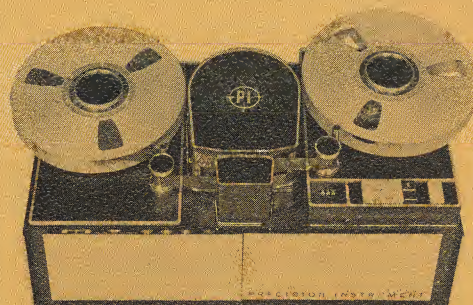
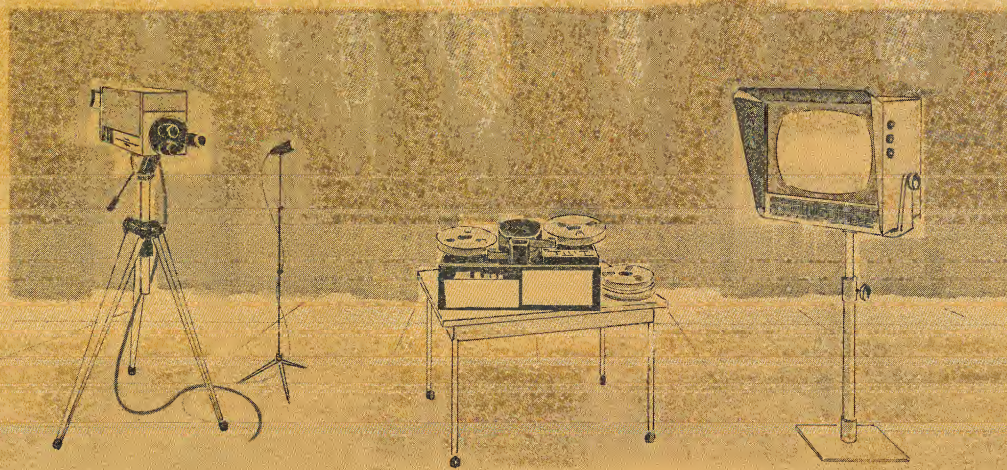
*for instruction, training, surveillance,
in industrial, educational, medical, military,
and other television applications*



NEW
STOP-MOTION FEATURE
To stop the motion instantly and hold the picture still for detailed study at any point during playback, simply depress a button and turn the Stop-Motion knob. Release the button and the action resumes.

**PRECISION
INSTRUMENT**





SIMPLEST WAY TO RECORD SIGHT AND SOUND ON TAPE

what the camera sees and the microphone hears, the PI-3V records and preserves on magnetic tape

ready for playback immediately, or hours or months later, as many as 100 times or more

for playback on the same or any other PI-3V recorder, over one or any number of TV monitors

Stop-Motion can "freeze" the action

re-usable tapes

As easily as making a sound tape with a microphone and an ordinary home audio recorder, the PI-3V makes a television tape using only a simple TV camera and microphone, or from any TV set.

When you've completed recording all or part of a reel of tape, no further processing is necessary; it's ready for playback immediately or at a later date. The sight and sound are as "live" as the original action, and remain so even after being played back many hundreds of times.

Tapes are interchangeable, and so recordings made on any PI-3V can be played back on any other PI-3V. They can also be played back on the broadcast version of this recorder for telecasting. The output of the recorder may be connected directly to one or several picture-and-sound monitors, to an audio/video distribution system, or to a picture-sound modulator for transmission on a TV carrier channel.

Simple controls on the recorder enable you to stop the motion instantly, at any point during playback, and hold a single picture on the monitor for detailed study.

When a recording has outlived its usefulness, the tape may be simply erased and re-recorded with new program material. Erase facilities are incorporated in the recorder.



SIMPLEST TV RECORDER TO SET UP AND OPERATE

to install, simply plug in to wall socket

The PI-3V recorder will operate wherever ordinary 50 or 60 cycle 110 Volt power is available. Simply plug it in, connect cables from microphone and camera, and you're ready to record. Attach a monitor and you're ready to play back.

tape is easy to load

Easier by far than threading a movie projector, the tape simply drops in place on the lower level, wraps around the head assembly, and again drops in place on the upper level. There is no difficult "threading through" of the tape.

foolproof push-button operation

To record, once you've established the proper audio and video levels, merely push the **play** and then the **record** button. The PI-3V does the rest. Should you be recording less than a full reel (96 minutes*), push the **stop** button, then **rewind**, and the recorder is ready to play back what you have recorded.

even the "technical" controls are simple and easy to operate

Aside from the push-buttons, the only controls you'll ever need in normal operation are the video and audio level, phase control, and meter selector switch. Level controls are set to the proper pre-determined level on the meter, and need not be adjusted during the recording.

tape tensioning is completely automatic

There is no need to adjust tape tension on the PI-3V, nothing to adjust. Heads function for their entire life without adjustment.

SIMPLEST TV RECORDER, ELECTRICALLY AND MECHANICALLY

the only TV recorder which used 1" tape

a basically new recorder design, with fewer, smaller elements

greater reliability, longer life

lower power consumption

The PI-3V is the only television recorder to use one-inch-wide magnetic tape — tape that is easier to thread on the machine, easier to store, and easier to ship. All other TV recorders, as far back as the original studio machine, have used two-inch tape with its attendant larger bulk and greater mechanical complexity of the transport.

Instead of trying to compress an inherently large recording mechanism into a smaller package, PI-3V engineers developed a device based on advanced concepts of design simplification and miniaturization. The result was a TV recorder with far fewer moving parts, fewer transistors, and no vacuum tubes.

The advanced electronic and mechanical principles embodied in the PI-3V's design have resulted in unprecedented simplicity and reliability of operation. For example, to assure that the transport — the heart of the recorder — would retain its alignment, the recorder was designed with 3 legs instead of 4 . . . to thus avoid any possible strains due to placement of the recorder on uneven surfaces. To insure freedom from maintenance, all moving parts subject to frictional contact are lubricated for the entire lifetime of the machine.

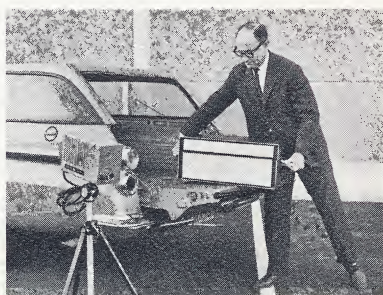
The power consumption of the PI-3V is only 350 watts — less than many home TV sets use.

A TRULY PORTABLE TV RECORDER

portability makes it practical to use anywhere

the only "1-man portable" TV recorder; far smaller and lighter than any other

one-man portable



Need a PI-3V in London tomorrow morning? Carry it aboard Flight 227 tonight! Because the PI-3V can go anywhere you can go, it can bring the advantages of closed-circuit TV to any situation, any application. No matter where it is needed, for recording, playback, or both, it's always ready to go.

The PI-3V weighs only 75 pounds, occupies only 2 cubic feet of space. Together with today's lightweight camera and monitor equipment, a recording crew is no longer needed; the entire system can be simply transported and set up by the operator alone. The back-seat of a compact car will easily accommodate a complete TV recording and playback system.

The PI-3V incorporates carrying handles at either end, enabling one man to lift and carry it without difficulty or risk or danger to the equipment. The handles fold neatly into the ends when not in use.

FOR EXISTING TELEVISION SYSTEMS

greatly enhances the usefulness of almost every system

makes possible repeat performances

enables recording of program material otherwise not available to audiences

compatible with all standard closed-circuit TV systems

With a PI-3V, you no longer need to schedule the program material and the viewing simultaneously. Both can be handled quite independently of each other, each scheduled at a time of maximum convenience.

No longer is valuable program material "lost and gone forever" at the conclusion of a television viewing session. It can be repeated at will, for the same or different audiences, enabling more people to see it more effectively.

In the surgical operating theater, for example, much valuable training and demonstration material has been denied to students and others simply because an operation takes place at an unexpected time, or can not be scheduled for the convenience of a viewing audience.

The PI-3V recorder was designed specifically to fulfill the television tape recording needs of existing TV installations, and is completely compatible with systems utilizing composite video signals from any image orthicon or vidicon source, with either EIA standard or industrial sync.

FOR NEW TELEVISION APPLICATIONS

extends training benefits to a much wider audience

makes it practical for surveillance recording of difficult material

provides a means for communicating audio-visual intelligence of every description

TV tape recording, built around the PI-3V, becomes economically justifiable for many applications simply on the basis of its repeatability. Consider the possible savings in time and talent, for example, if important lectures and demonstrations are recorded on tape and made available to a succession of audiences or classes.

For industrial or military applications where continuous and extended observation must be maintained, a PI-3V recorder can assume the burden and preserve a record of what happens. In environmental test chambers, for example, or wind tunnels, or materials testing projects, the TV camera's eye observes without fatiguing, and what it sees is stored on magnetic tape for later analysis. If nothing of significance occurs during the period of observation, the tape may be simply erased and used again.

The possibilities opened up by the PI-3V are endless. With it, the president of a company with far-flung interests can put in an "appearance" at remote plants without leaving his office. New fabricating techniques can be disseminated widely, new skills taught to large numbers of workers. Dangerous or inaccessible processes can be monitored easily and safely; taped records of meetings, conferences, and demonstrations can be reviewed at will.

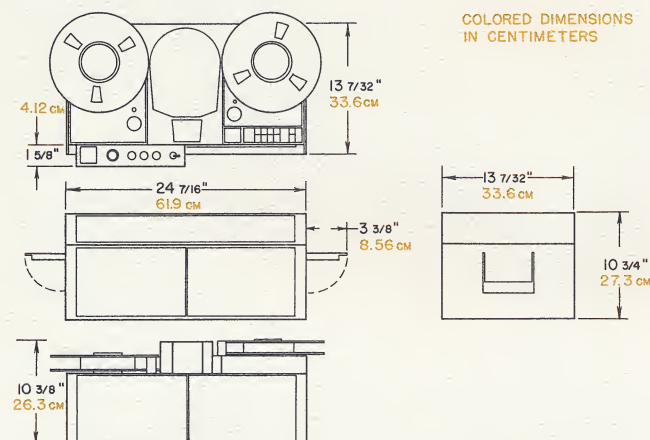
SIMPLIFIED DESIGN & CONSTRUCTION

The PI-3V recorder's compact, precision design reflects the same skills and engineering competence which enabled PI to develop the first all-transistorized instrumentation tape recorder, and subsequently, to build miniaturized recorders for uses such as data acquisition in Agena satellites. Extending the same principles—simplicity and compactness of design, ultra-high mechanical and electrical reliability—to television recording, PI has produced this simplest-to-use, easiest-to-maintain unit without any sacrifice in quality or reliability.

All mechanical and electrical components of the PI-3V are of modular construction and are easily and completely interchangeable in the field. All moving parts concerned with tape motion are firmly mounted to a single precision-machined aluminum casting. The tape transport mechanism is rugged, stable, and mechanically simple.

Electronic circuitry is contained on high-reliability plug-in printed circuit modules. Any module may be tested while operating outside the recorder, through the use of an extender (provided).

PHYSICAL SPECIFICATIONS



Weight	75 lbs.
Cube	2.0 cu. ft.
Mounting	Portable
Reel Size	Max.—10½" NAB reel
Operating Area (less reels)	2.5 sq. ft.

OPERATIONAL SPECIFICATIONS

Power Requirements	105–125 Volts, 50/60 Cycles, 350 Watts
Tape Speed	7.5 ips
Tape	1" Video tape, longitudinally oriented
Record/Playback Time	Up to 120 minutes on a 10½" reel

Precision Instrument Company reserves the right to change specifications without notice or obligation.

Start Time	5 seconds maximum
Stop Time	Less than 2 inches of tape passes the heads after stop button is depressed
Rewind Speed	3600 feet in 3 minutes (Better than 30 times play speed)

VIDEO SPECIFICATIONS

Input	Single Input composite video (black negative) 75 ohms unbalanced adjustable from front panel control from 0.5 to 1.4 V peak-to-peak
Output	2 Identical outputs, 75 ohms unbalanced source terminated, adjustable from 0.5 to 2.0 V peak-to-peak
Horizontal Resolution	Over 300 lines with suitable display equipment
Signal-to-noise Ratio	Less than 100 mv peak-to-peak noise on 1-volt black to white video signal, on interchanged tapes
Transient Response	Rise time less than 0.25 microsecond (10% to 90%) on pulses measured with pulse inputs with 0.1 microsecond rise time
Differential Gain	Less than 10%

AUDIO SPECIFICATIONS

Inputs	Unbalanced line: 200 k Ohms, —10 dbm minimum or Microphone: 1 Millivolt minimum
Outputs	+6 dbm into 600 Ohm unbalanced line
Frequency Response	±2 db from 50–10,000 cps with bias peaked to tape being used
Signal-to-noise Ratio	40 db or more, on interchanged tapes

OPTIONS AND ACCESSORIES

One audio channel standard; second audio channel available on special order

Video Head Disc Assembly (Spare)	Cat. 20001270A
Remote Control Assembly with 30 ft. cable	Cat. 20004150
Remote Control Panel (Unmounted)	Cat. 20004170
Test and Alignment Tape	Cat. 20025605

SPECIFICATIONS — 50 Cycle Version When the PI-3V is supplied for operation on 50 cycle current, specifications are modified as follows:

Tape Speed	6.25 ips
Record/Playback Time	115 minutes on a 10½" reel
Start Time	6 seconds approx.
Rewind Time	180 seconds approx.
Video Resolution	Over 240 lines with suitable display equipment
Video S/N Ratio	Less than 115 mv
Audio Frequency Response	±3 db, 60 cps to 8 kc
Audio S/N Ratio	36 db or more



PI-4V PORTABLE VIDEO RECORDER

featuring slow motion and stop motion for television and certain broadband instrumentation applications.

Precision Instrument's new PI-4V video recorder broadens the flexibility and usefulness of television recording by making it possible to play back video recordings in variable slow motion or to display a single video field as a still picture, in addition to normal playback. It also provides two longitudinal tracks for high fidelity sound or narrow-band data recording, and either or both of these may be erased separately and re-recorded without disturbing the video material. All these functions are achieved in a portable 2-cubic-foot, fully-transistorized unit that weighs less than 75 pounds and will record up to 85 minutes on a single 10½-inch reel of 1-inch magnetic tape at 8.46 ips tape speed.

In addition to its obvious television applications, the PI-4V may also be used as a broadband instrumentation recorder for such things as transient signal analysis. In this case, the two longitudinal tracks may be used independently for either audio information or narrow-band data to 10,000 cycles per second.

This performance flexibility in such a compact package is possible because the PI-4V is one of a new generation of video recorders using a two-head, closed-loop, helical-scan system of recording. The two heads, mounted 180° apart on a revolving disc, alternately record nominal 11-inch tracks diagonally across the moving tape. Head-to-tape speed is better than 630 inches per second. Each track represents one video field—or half a video frame—in television recording, and in broadband recording contains 16.67 milliseconds of recorded data.

One of the prime advantages of PI's helical-scan system is that it permits the use of standard one-inch video magnetic tapes in place of the unwieldy two-inch tape originally necessary for video recording. The trend in high-precision recording is toward narrower tape since this is inherently easier to guide and control than wider tape. It also permits the use of a motion-stabilizing closed-loop tape drive, and the required mechanisms are simpler and more compact. In addition it allows simpler controls so that the average non-technical person can learn to operate the PI-4V with just a few minutes instruction.

The PI-4V may be used with any standard CCTV system without additional equipment or special adjustment. All routine maintenance—including replacement of the video scanning disc assembly when this becomes neces-

sary—can be performed by the operator using standard tools.

OPERATIONAL FEATURES OF THE PI-4V

Tape Speed Options Standard speed on the PI-4V is the new VariScan* speed of 8.46 inches per second, which makes possible slow motion playback from zero to 8.46 ips with a minimum of picture interference. The PI-4V may also be ordered from the factory or converted in the field to operate at 7.5 ips in order to provide complete tape interchangeability with earlier PI-3V recorders. With either option, StopScan* may be used to view a still picture on playback.

StopScan* This feature permits the operator, with a single pushbutton control, to stop the tape motion and cause the video heads to repeatedly scan a single recorded track, thus displaying a complete, high-resolution still picture on the monitor screen. Tape angle is automatically changed by this control to achieve 100% tracking and provide the best possible picture quality.

VariScan* This function permits the linear speed of the tape to be varied smoothly from zero to a nominal 8.5 ips on playback, and is possible only on PI-4V's with the standard recording speed of 8.46 ips. Controlled by a single knob, VariScan provides a continuously-variable slow motion effect on the monitor.

The 8.46 ips recording speed is necessary so that sync pulses on adjacent tracks will line up at right angles to the direction of the recorded tracks. Thus when the heads see more than one track on playback—as they will whenever the tape is moved at a speed other than the recording speed—conflicting sync information is not sent to the monitor.

Controls Interlocked, illuminated pushbuttons are provided for Rewind, Fast Forward, Play, Stop, Video Record, and Audio Record functions. StopScan is controlled by a single pushbutton, and VariScan by a single rotary control. All these functions, except VariScan speed, may be remotely controlled.

Tape Position Indication A three-digit tape timer indicates tape position from selected starting point in minutes and tenths of minutes.

Power The PI-4V operates on 105–125 VAC line power, at 60 cps $\pm 1\%$. Maximum power consumption is 350 watts. 50 cps model available on special order.

TECHNICAL AND PROCUREMENT SPECIFICATIONS

1.0 GENERAL

- 1.1 **Size:** 24 $\frac{1}{16}$ " W x 13 $\frac{3}{32}$ " D x 10 $\frac{3}{8}$ " H.
- 1.2 **Cube:** 2.0
- 1.3 **Operating Area:** 2.3 square feet.
- 1.4 **Weight:** Less than 75 pounds.
- 1.5 **Configurations:** Portable. Ruggedized mobile rack version on special order.
- 1.6 **Power:** 105–125 VAC, 60 cps $\pm 1\%$, 350 watts maximum. (50 cps model available on special order.)
- 1.7 **Recording Medium:** Standard 1-inch magnetic television tape. Up to 3600 feet on standard 10 $\frac{1}{2}$ -inch NAB precision reel. Memorex 75-P or equivalent.
- 1.8 **Recording and Playback Speeds:** 1). Standard: (VariScan Model) 8.46 ips record; fixed 8.46 ips and 0 to nominal 8.5 ips continuously variable playback. (Tapes interchangeable only with other VariScan models.) 2). Optional: (Non-VariScan Model) 7.5 ips record; 7.5 ips playback. (Tapes interchangeable with all PI-3V models.)
- 1.9 **Rewind and Fast Forward Speeds:** 3600 feet in 3 minutes. (Better than 30 times play speed.)
- 1.10 **Maximum Recording Time:** 85 minutes per 3600' reel at 8.46 ips. 96 minutes per 3600' reel at 7.5 ips.
- 1.11 **Start Time:** 10 seconds.
- 1.12 **Stop Time:** 1 second.
- 1.13 **Operating Controls:** All front panel accessible.
 - Transport:** Power On/Off, Rewind, Fast Forward, Play, Stop, Record Master, StopScan and VariScan.
 - Electronics:** Meter Selector, Video Gain, Audio Gain (1 and 2), Phase, Audio Record Override (1 and 2).
 - Indicators:** Digital Tape Position (by minutes and tenths), VU Meter.
- 1.14 **Remote Controls:** (With remote control accessory unit.) Rewind, Fast Forward, Play, Stop, Record Master, Normal/VariScan Tape Motion, StopScan.

2.0 VIDEO/BROADBAND PERFORMANCE SPECIFICATIONS

- 2.1 **Recording Method:** Two video heads placed at 180° on Video Scanning Disc Assembly rotating at 30 rps, record data in 16.67 millisecond increments on approximately 11-inch diagonal tracks. Servo system automatically positions switching transient to fall in the back porch of the vertical interval of the composite video signal, and may be precisely located by simple adjustment.
- 2.2 **Composite Video/Pulse Response:** 10 cps to 3.5 Mcps ± 3 db, referenced to 1 Mcps.
- 2.3 **Signal-to-Noise Ratio:** Better than 30 db p-p signal to rms noise, by scope measurement.
- 2.4 **Playback Switching Transient:** Less than 10 microseconds duration, clamped to blanking level.
- 2.5 **Pulse Rise Time:** 0.25 microsecond or better, 10% to 90%.
- 2.6 **Differential Gain:** Less than 10%.
- 2.7 **Time Base Error:** Less than 0.5 microsecond over any 100 microsecond period. Within FCC Rules and Regulations, Volume III, January 1964, Subpart E, Section 73.687 (7) and (8).

3.0 AUDIO/NARROW-BAND PERFORMANCE SPECIFICATIONS

- 3.1 **Recording Method:** Direct, with stationary record/reproduce heads.
- 3.2 **Frequency Response:** 60 to 10,000 cps ± 3 db with bias peaked to tape being used.
- 3.3 **Signal-to-Noise Ratio:** Better than 40 db, rms signal to rms noise.
- 3.4 **Flutter and Wow:** Less than 0.2% rms measuring all components from 0.5 to 250 cps.
- 3.5 **Distortion:** Less than 3%.

4.0 SPECIAL FUNCTIONS

- 4.1 **StopScan:** Single pushbutton control permits tape motion to be stopped while head scanning disc continues to rotate and scan a single recorded track. Subjective effect at the monitor during playback is a still picture of any single field in the recording. Automatically changes tape position to compensate for change from dynamic scanning angle to static scanning angle, providing exclusive 100% tracking. May also be used to display segments of broad-

band data up to 16.67 millisecond duration, on an oscilloscope. Disc pulse from broadband channel servo may be used to trigger delayed sweep on oscilloscope for expanded presentation of desired track segment.

- 4.2 **VariScan:** The standard PI-4V which records at 8.46 ips incorporates the VariScan function which permits the recorded material to be presented on a monitor screen in any degree of slow motion. This is accomplished on playback with a continuously-variable rotary control that permits the operator to set the linear tape speed anywhere from zero to a nominal 8.5 ips. This function is useful also in data recording in searching for significant data for StopScan analysis.

5.0 INPUTS AND OUTPUTS

- 5.1 **Video Channel Input:** 0.5 to 1.4 volt p-p composite video signal, 60-field industrial or EIA sync, black negative, 30% sync — 70% picture $\pm 5\%$, 75 ohms unbalanced, source terminated, adjustable from front panel.
- 5.2 **Video Channel Output:** Two identical outputs, 1.4 volt p-p, 75 ohms unbalanced, adjustable internally for driving several monitors.
- 5.3 **Audio Channel (2) Inputs:** Unbalanced high-impedance bridging, —10 dbm minimum, or low-impedance microphone —60 dbm nominal (1 millivolt).
- 5.4 **Audio Channel (2) Outputs:** +6 dbm into 600 ohm unbalanced line.

6.0 ENVIRONMENTAL SPECIFICATIONS

- 6.1 **Operating Position:** Designed for horizontal operation, but may be operated up to vertical position with suitable reel holdowns.
- 6.2 **Ventilation:** Requires no forced external ventilation provided it is protected from radiant heat of adjacent equipment and has 6-inch clearance on all four sides.
- 6.3 **Temperature:** 0°F. to 125°F. non-operating. 40°F. to 120°F. operating.
- 6.4 **Altitude:** Sea level to 15,000 feet unpressurized, operating.
- 6.5 **Humidity:** 5% to 95% non-condensing, operating.
- 6.6 **Shock and Vibration:** Normal surface transportation handling and shipping shock and vibration.
- 6.7 **Sand, Dust and Moisture:** Must be protected from contaminating atmospheres which are discomforting for operating personnel.

7.0 ACCESSORIES

- 7.1 **Remote Control Unit:** Duplicates all tape motion and function controls on transport except audio/video level settings, VariScan speed variation, and servo phase.

8.0 WARRANTY

- 8.1 **Quality Assurance:** Fully tested for conformance to specifications per MIL-Q-9858A.
- 8.2 **Product Warranty:** PI Video Recorders are warranted against defects in material and workmanship for a period of one year from date of delivery to the original using purchaser, except for tape, transistors, and diodes, which carry their own manufacturer's warranties, and the Video Scanning Disc Assembly which is separately warranted by PI against electrical or mechanical failure, using specified or equal brand tape, during the entire useful life of the two video heads, during which their gaps are wearing down to zero gap depth (no output).

Precision Instrument Company reserves the right to change specifications without notice or obligation.

**PRECISION
INSTRUMENT**



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MAGNETIC TAPE RECORDERS, ACCESSORIES & COMPONENTS

SHORT-FORM CATALOG

PI manufactures magnetic instrumentation tape recorders for data acquisition, processing, and reproduction; and television tape recorders for video applications. These recorders are characterized by advanced design and engineering features oriented to user needs — to make the many benefits of tape recording available in the simplest, most practical hardware.

PI recorders are in everyday use throughout the world to gather every type of data — scientific, commercial, military — that is convertible into electrical signals. You'll find PI tape recording instruments in missile data reduction centers and in medical laboratories, in flying test beds and in geophysical instrumentation vans. You'll find them used in submarine recording, research, industrial process control, and television recording. PI recorders bring to these and countless other applications the experience and capability of a company devoted exclusively to magnetic tape recording, and a record of frequent and significant advancement of tape recording state-of-the-art.

**PRECISION
INSTRUMENT**



Precision Magnetic Tape Recorders

Three basic types of recorders are manufactured by PI: **miniature** recorders for use in space vehicles and related applications where small size, high reliability, and light weight are the determining factors; **compact** recorders for applications which require portability and ruggedness, or which afford only limited space; and

precision **laboratory** recorders of advanced design. In addition, PI manufactures special purpose recording instruments and instrumentation accessories to complement the recorders shown here. Detailed information may be obtained from your local PI engineering representative, or from the PI Marketing Department.



ADVANCED LABORATORY RECORDER

PI-400A The PI-400A is a high-performance instrumentation recorder designed for use in data acquisition and reduction centers, for the laboratory, and for general-purpose application requiring a high order of accuracy and precision. The PI-400A offers the fundamental advantages of a low inertia, high-torque drive system, and incorporates a number of refinements and advancements in technique, including crystal-controlled tape speed, electronic-servo-control of tape tension, and facility for automatic operation within a digital system. Pushbutton controls actuate logic circuits which are programmed to guide the transport from any operating mode to any other operating mode, thereby eliminating the factor of human error in control of the transport.

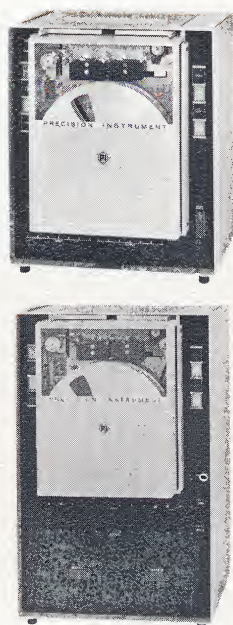
A highly practical convenience feature is total accessibility of all component units of the recorder, even during operation. For example, the entire tape transport may be rotated on vertical pivots while recording or reproducing.

Tape accommodated 1/2" or 1" tape.

Tape Speeds 1 1/2, 3 3/4, 7 1/2, 15, 30, and 60 ips, all 6 speeds electrically selectable, for recording or reproducing in both directions.

Recording Modes Direct: FM carrier; PDM; DIGITAL.

Data Bandwidth Direct: up to 250 kc at 60 ips; FM: 20 kc at 60 ips.



PORTABLE/COMPACT RECORDERS

PI-200 Series These precision-designed recorders offer performance usually associated only with laboratory instruments of much larger size and greater expense. First instrumentation recorders to utilize all-solid-state electronics, they are widely used both as fully portable field units and in rack-mounting applications in submarines, aircraft, instrumentation vans, and in data laboratories.

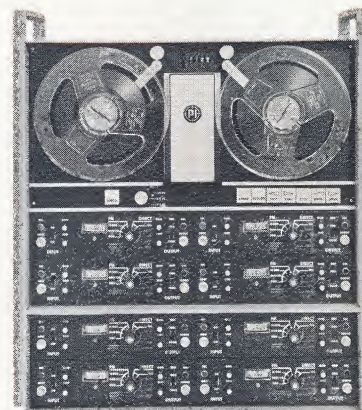
PI-200 recorders are available in 1/2" (7-channel) and 1" (14-channel) models, occupying 2 and 3 1/2 cubic feet respectively. They utilize PI's unique stacked-reel tape magazine concept which not only saves space but also permits instant interchangeability of magazines without requiring rewinding of tape. Interchangeable loop magazines are also available — see page 4.

Tape accommodated 1/4", 1/2", or 1", on standard 10 1/2" reels.

Tape speeds Either 4 or 6 standard speeds from 1 1/2 through 60 ips, in ratio of 1:2:4:8:16:32; push-button change between any 2 speeds in 1:2 ratio.

Recording Modes Direct; FM; Digital.

Data Bandwidth Direct: 200 kc at 60 ips. FM: 20 kc at 60 ips.



GENERAL PURPOSE LAB RECORDER

PI-6100 This unusually versatile recorder offers many advantages for recording such phenomena as bio-medical parameters, process variables, transients, and other analog data occurring at frequencies up to 100,000 cycles per second. A unique feature is the ability of the instrument to compress or stretch data in the ratio of 10-to-1 and 100-to-1. Thus it could be used to monitor a process from 4 o'clock pm until 8 o'clock the next morning, for example, and the entire night's operations could be played back in 9 1/2 minutes. Or, conversely, the recorder could capture the complex vibrations, pressure and temperature changes of an explosive detonation, and spread them out over several minutes for detailed analysis.

Other facets of the PI-6100's versatility are its FM/Direct front-panel-switchable electronics, its built-in calibration, single-channel through 8-channel operation on 1/4" magnetic tape, precision closed-loop transport, and speed control comparable with that of much more costly machines.

Tape Accommodated 1/4", on standard 7" reels.

Tape Speeds 37.5 ips, 3.75 ips, and .375 ips.

Recording Modes Direct and FM.

Data Bandwidth Direct: To 100 kc. FM: To 10 kc.

Power 105-125 or 210-250 V AC, 50-400 cps. or + and -12 V DC. Optional + or -12 V DC.



LONG-TERM MONITORING RECORDER

PI-5100 For recording such variables as earthquakes, underground shockwaves, and related geophysical phenomena; and for long-term monitoring of industrial and process variables, the PI-5100 will record for 10.6 days* without attention. It is designed to function in a variety of environments, at temperatures from 20°F to 140°F, in relative humidities to 100%, and at altitudes up to 15,000 feet.

The PI-5100 utilizes a stacked-reel design which enables the use of 14" diameter reels and yet allows the entire recorder to be fitted into a carrying case measuring only 18½" x 15" x 10". Weight, including tape, is 35 pounds, affording easy portability. The case is sealed against moisture and can be carried in the open in any weather.

As many as 7 data channels and two edge tracks may be recorded in IRIG format. Input requirements are 1 volt RMS into 10K ohms. Power required is 12 volts dc, with power drain of 7.5 watts maximum during operation.

Tape accommodated ½", on standard 10½" or 14" reels.

Standard tape speed* 15/160 ips.

Recording Mode FM.

Data Bandwidth* DC-17 cps.

* With modification, can be as slow as 1⅞ ips (bandwidth of 10 cps) or as fast as 1⅞ ips (bandwidth of 170 cps) with recording times of 32 days and 25½ hours respectively.

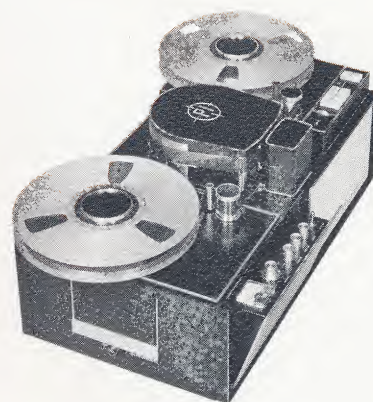


INCREMENTAL RECORDERS

PI incremental recorders produce tapes from data, received either synchronously or asynchronously (randomly), in formats that are compatible with IBM, CDC, and similar computers. Pulses, accepted at widely varying rates, are converted into standard NRZ digital tapes with the required uniform packing densities. Thus these recorders can eliminate the need for intermediate punched paper tapes, or other temporary storage devices, by converting the random pulse data into a format directly usable by the computer.

Upon receipt of a digital character, the recorder advances the tape 1/200 or 1/556 of an inch and awaits the next character. The Model RSL-150 produces 200 BPI tapes, with a maximum stepping rate of 150 characters per second for asynchronous data; the Model PI-1100 produces 200 or 556 BPI tapes, at stepping rates to 300 per second, and also is available with an incremental read capability in the 200 BPI format.

Both models accommodate 10½" reels, with 7 tracks, including parity and clock tracks, on ½" tape. Input requirement is for -12 volt pulses with 5 μsec rise time. Power required is 115 volts, ±10%, 48 to 62 cps. The Model RSL-150 uses 30 inches of standard rack space; the Model PI-1100 36 inches.



TELEVISION RECORDER

PI-3V For use in medical, military, industrial, and educational television applications, the PI-3V records more than 1½ hours of sight and sound on a single reel of 1" tape. Playback may be immediate, or days or years later, once or hundreds of times; and the tape may be simply erased and re-used when the recorded program material has outlived its usefulness.

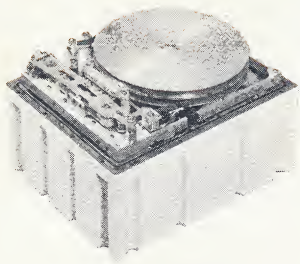
For detailed study of a portion of the televised material, the PI-3V's "Stop-Motion"* feature enables the operator to "freeze" a single picture and thus observe it for several minutes. This feature is also useful in studying fast transients displayed on an oscilloscope.

Tapes recorded on one PI-3V recorder are completely interchangeable. The recorder is compatible with EIA standard or industrial sync, and operates from either vidicon or image orthicon TV cameras.

The PI-3V, because it uses 1" tape and advanced all-solid-state circuitry, is extremely compact and readily transportable (only 75 pounds) by one man. An entire TV system—including camera, monitor, and the PI-3V—can be put into the rear seat of a compact car. The PI-3V requires only 350 watts of power—plugs into any 110-volt, 50 or 60 cycle wall socket.

One audio channel is standard; a second audio channel is available on special order.

* T.M.



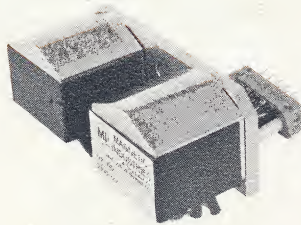
SATELLITE RECORDERS

PS-303-T First orbited in Agena satellites in the Air Force's Discoverer program, recorders of this series now have an extensive record of use in space. They offer operational characteristics that make them especially useful where there is a premium on size and weight.

PS-303-T recorders are built to the applicable sections of MIL-E-8189 specification, and are the only satellite recorders known to qualify under the environmental specifications of LMSC 6117-B.

Exceptional reliability is achieved through simplicity in design and function. For example, by recording in one direction, playing back in the other, the need for the normal re-wind function is eliminated.

In operation, the recorder accepts data during more than 90% of its total time in flight. Upon receipt of a signal from the ground, it instantly goes into playback mode at many times recording speed. Record or reproduce functions can be interrupted at any time, and operation can be accomplished in either mode.



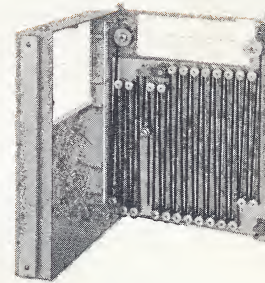
PRECISION HEADS

Precision magnetic heads for recording, playback, and erase functions are manufactured by Magnetic Industries, a subsidiary of Precision Instrument, for PI and other recorders. Standard and special headstack configurations are available; custom heads are manufactured to specifications, for analog, digital, and special-purpose recorders.

A continuing program of materials research has resulted in head designs which minimize both head wear and magnetic tape wear. High levels of performance are thus assured for significantly longer than with conventional head designs.

PRECISION FILTERS, COILS, TRANSFORMERS

MI also manufactures a variety of magnetic devices other than heads, including toroidal coils, high frequency transformers, filters, and complete networks, all made in conformance with customer specifications. In addition, MI is experienced in the design and manufacture of high-reliability solid-state converters, specialized airborne transformers, and switching, peaking, and differential transformers.

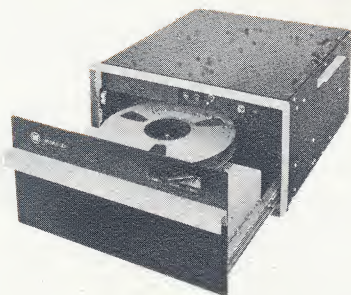


CONTINUOUS LOOP MAGAZINES

PI has designed a number of recording accessories to extend the usefulness of its basic products. The tape loop, for example, permits Series 200 recorders to be used for monitoring recording, repetitive playback, and continuous recording/reproduction. With the standard loop magazine (above) or the variable delay loop magazine, tape loops from 29 inches up to 24 feet are accommodated. Longer loops are also available in special configurations.

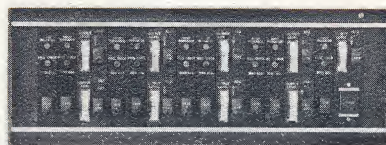
Another loop magazine is available that is designed to record data and reproduce the recorded signals after the loop has made a full circuit. An erase head — an integral part of the magazine — erases the tape after reproduction, preparing the tape to accept incoming signals continuously. Use of this magazine requires a modification in which the record and reproduce heads are reversed in position.

A Series 200 recorder may be adapted for continuous loop operation simply by attaching the loop magazine in place of the reel-to-reel magazine. No change whatever is required in the recorder itself; magazines may be interchanged at any point on the tape.



AUTOMATIC DEGAUSSER

The DG-2 Automatic Degausser will erase a full reel (7" through 14" sizes) of magnetic tape in 35 seconds. Residual signal and peak noise are at least 80 db below saturation recording level. Rack or cabinet (desk-top) mounting; approximately 1/2 cubic feet.



TELEMETRY DISCRIMINATOR

The TD-109 IIRIG Subcarrier Discriminator comprises nine complete solid-state channels, with an input meter for each, in only 7" of rack space. All IIRIG subcarriers, channels 1 through 18 and A through E.



MOTOR DRIVE AMPLIFIERS

Where PI recorders are to be operated from a dc power source, or an ac power source which varies from 60 cps, a PI Motor Drive Amplifier may be used to generate a precise 60 cps. Rack or cabinet mounting.

PRECISION INSTRUMENT



Stanford Industrial Park / Palo Alto, California

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